

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PELAGIC OSTRACODS (MYODOCOPA HALOCYPRIDAE) FROM THE NORTH ATLANTIC OFF BARBADOS¹

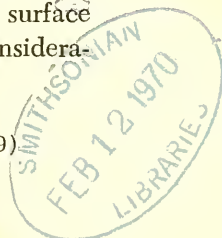
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In connection with a study on primary productivity in the tropical North Atlantic off Barbados and in the Caribbean Sea off Jamaica, zooplankton samples were collected and the related hydrography and nutrient chemistry investigated by Beers, Steven and Lewis (1965, 1968) in a project carried out jointly by members of the staffs of the Bermuda Biological Station, the University of the West Indies in Jamaica, and the Bellairs Research Institute in St. James, Barbados. The zooplankton tows collected at the station off Barbados were stored at the Bermuda Biological Station, and these samples have been examined for pelagic ostracods. The majority of the zooplankton hauls were surface tows, collected to obtain an estimate of the standing crop of zooplankton, but between September 1963 and May 1964 samples were also collected at a depth of 400 m. Very few ostracods were found in the surface samples, but 26 species of Halocyprids were recorded from the six 400-m samples obtained in September, October, November 1963 and January, April and May 1964.

The Barbados station, at 15°12'N, 59°47.5'W, in 450 m of water, is eight miles west of the Bellairs Research Institute in St. James. The zooplankton tows were made with a half-meter diameter net of No. 8 nylon mesh, equipped with a flow-meter which recorded the distance towed in meters. The surface tows, which caught too few ostracods for further considera-

¹ Contribution No. 480 from the Bermuda Biological Station.



tion, were of 10 minutes duration; the 400-m hauls were towed for 30 minutes. All the ostracods were removed, counted and identified from one-fourth of each 400-m sample. In the following listing of the species only those species will be described and figured that were not included in my report on the pelagic ostracods of the Sargasso Sea (Deevey, 1968). The species found at the station off Barbados, which were not taken in the Sargasso Sea, include *Fellia bicornis* (Müller), *Conchoecia echinata* Müller, *C. nasotuberculata* Müller, *C. parvidentata* Müller, and *Euconchoecia* sp.

Ostracods constituted at most 0.4 percent of the total numbers of organisms at the surface, but percentages ranged from 0.2 to 6.8 percent in the 400-m samples. The species of ostracods are listed in Table 1, which also gives the percentages of each species, based on the total numbers of ostracods. Highest numbers were found from November to May; few were present in September and October. Unidentifiable juvenile ostracods constituted 27–46 percent of the total numbers of ostracods. The most abundant species were all small, ranging 0.6–1.6 mm in length, and included *Archiconchoecia striata*, *Conchoecia curta*, *C. oblonga*, *C. procera*, and *C. spinirostris*. *Conchoecia acuminata*, *C. atlantica*, *C. elegans*, *C. parthenoda*, *C. porrecta* and *C. rotundata* were also relatively numerous and occurred in every sample. The commonest species at the Barbados station were also the most abundant in the Sargasso Sea (Deevey, 1968). One species, *C. imbricata*, which occurred year-round in the Sargasso Sea, was not taken at Barbados; other species including *C. atlantica*, *C. acuminata*, *C. bispinosa*, *C. elegans*, and *C. porrecta*, were more numerous at the Barbados station.

Data for temperature, salinity and nutrient chemistry were obtained from the surface down to 300 m, but not to 400 m, during the period studied. At 300 m the temperature range was 10.51–15.12°C, with a mean of 13.08°C, and the salinity varied between 35.1 and 35.9‰.

The samples were collected under Contract NONR 1135(05) from the Office of Naval Research. This study was supported partly by grant GB-2668 and partly by GB-6879, both from the National Science Foundation.

SUBORDER HALOCYPRIFORMES Skogsberg 1920

FAMILY HALOCYPRIDIDAE Dana 1852

SUBFAMILY ARCHICONCHOECINAE Poulsen 1969

Genus *Archiconchoecia* Müller 1894*Archiconchoecia striata* Müller

Archiconchoecia striata G. W. Müller, 1894, p. 225, Pl. 6, Figs. 31–46, Pl. 8, Fig. 34; 1906a, p. 45, Pl. VII, Figs. 13–17; 1912, p. 56.
Archiconchoecia striata, G. B. Deevey, 1968, p. 23, Fig. 4.

This tiny species (males and females are 0.5–0.6 mm long) was one of the three most numerous ostracods, present in every sample, and constituted 2.4–17.3 percent (see Table 1) of the total numbers of ostracods.

Distribution: 36°N–37°S in the Atlantic, Indian, and Pacific Oceans and Mediterranean Sea.

SUBFAMILY EUCONCHOECINAE Poulsen 1969

Genus *Euconchoecia* Müller 1890*Euconchoecia chierchiae* Müller

Euconchoecia chierchiae Müller, 1890, p. 277, Pl. XXVIII, Figs. 1–10.
Euconchoecia chierchiae, Skogsberg, 1920, p. 740, Figs. 148–151.
Euconchoecia chierchiae, Deevey, 1968, p. 116, Fig. 62.
Euconchoecia chierchiae, Poulsen, 1969, p. 38, Figs. 12–13.

This species was recorded in September and November 1963 and in January and April 1964 in small numbers.

Distribution: Atlantic, Pacific, and Indian Oceans between 40°N and 40°S.

Euconchoecia sp.

(Figure 1)

Three female specimens, differing from *E. chierchiae* females in appearance, were taken in the April 1964 sample. The shells (Fig. 1a–c) are 1.15, 1.17 and 1.2 mm long by 0.55 mm high, the height of the shell being around 47 percent of the length, and the greatest height just behind mid-length. There are no points at the posterodorsal corners of the shells, and the long point on the left rostrum, characteristic of *E. chierchiae* females, is also lacking. In *E. chierchiae* females from this station the depth of the shell is less, 38–42 percent of the length, the greatest height being just anterior to mid-length, there is a long spine at the posterodorsal corner of the right shell, and the left rostrum is produced into a sharp point.

The frontal organ is slim, undifferentiated, rounded at the tip, and reaches almost to the tip of the first antenna (Fig. 1d), which has distoventrally a cluster of 20–21 sensory filaments, all about the same length as the principal seta. The frontal organ differs from that of *E. chierchiae* in that it is rounded, not pointed nor bifid at the tip; also in *E. chierchiae* females the frontal organ reaches to the tip of the

TABLE 1. Percentages of ostracod species, based on total numbers of ostracods, from September 1963 to May 1964 in one-quarter of each 400-m sample. X indicates presence of species in one-quarter sample not counted.

	Sept.	Oct.	Nov.	Jan.	Apr.	May
<i>Archiconchoecia striata</i>	9.78	2.38	17.33	9.00	3.57	10.00
<i>Euconchoecia chierchiae</i>	X	—	1.93	0.56	1.78	—
<i>Euconchoecia</i> sp.	—	—	—	—	X	—
<i>Halocypris brevisrostris</i>	—	—	X	0.56	4.16	1.04
<i>Fellia bicornis</i>	X	—	—	X	—	—
<i>Conchoecia</i> unid. larvae	42.60	46.40	40.00	34.90	27.40	37.50
<i>C. acuminata</i>	X	2.38	0.39	0.28	0.30	0.21
<i>C. atlantica</i>	1.77	X	1.93	2.53	5.95	0.42
<i>C. bispinosa</i>	0.89	X	X	X	—	1.04
<i>C. concentrica</i>	2.22	—	0.39	—	0.30	0.21
<i>C. curta</i>	15.53	15.45	1.93	18.00	12.20	15.20
<i>C. daphnoides</i>	X	—	X	0.56	X	0.21
<i>C. echinata</i>	—	X	—	1.68	0.60	1.67
<i>C. elegans</i>	3.11	1.19	1.16	1.68	0.89	1.46
<i>C. magna</i>	1.78	1.19	1.93	2.53	—	1.67
<i>C. nasotuberculata</i>	—	—	—	X	—	—
<i>C. oblonga</i>	5.78	5.96	6.55	4.22	10.10	10.00
<i>C. parthenoda</i>	1.33	X	6.94	2.25	2.38	3.96
<i>C. parvidentata</i>	X	—	—	—	—	—
<i>C. porrecta</i>	0.45	2.38	2.70	X	0.30	0.21
<i>C. procera</i>	10.20	13.10	7.33	9.57	22.00	10.20
<i>C. rotundata</i>	1.33	2.38	2.31	4.22	2.68	1.67
<i>C. discernenda</i>	0.89	—	1.93	1.96	0.30	0.21
<i>C. spinifera</i>	X	2.38	—	0.56	—	—
<i>C. spinirostris</i>	2.22	4.76	4.24	4.78	5.06	2.08
<i>C. subarcuata</i>	X	—	X	X	—	0.62
<i>Conchoecia</i> sp.	X	—	—	—	—	0.42

first antenna. The basal segment of the exopodite of the second antenna is approximately 44 percent the length of the shaft; the basal segment of the endopodite is approximately 25 percent shaft length, and bears dorsodistally two bristles, the shorter of which is slightly more than half as long as the longer (Fig. 1e). The distal segment of the endopodite has one long seta, which was broken on all three specimens, and two shorter setae or filaments, the longer one slightly more than twice as long as the shorter; in *E. chierchiae* females the longer filament is less than twice as long as the shorter one. In the morphology of the other appendages there appear to be no marked differences between these females and female *E. chierchiae*. The furca has seven claws, with a

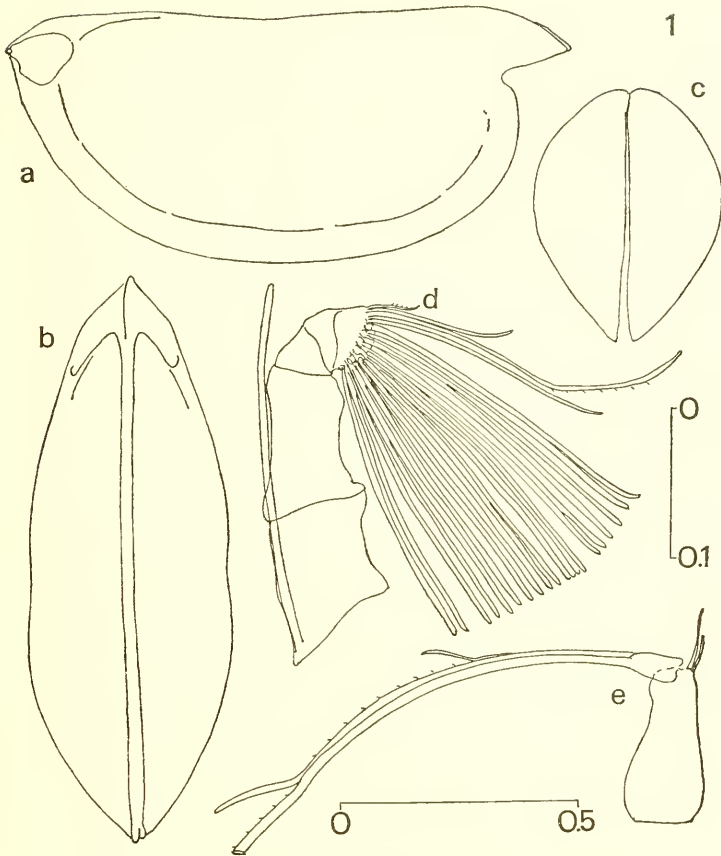


FIG. 1. Female *Euconchoecia* sp. a-c, Lateral, ventral and posterior views of shell. d, Frontal organ and first antenna. e, Endopodite of second antenna (long seta cut off). Scale at bottom for a-c, at right for d, e. Scales in mm.

pronounced knob between the first and second claws, and a tiny unpaired bristle behind the claws. The first several pairs of claws are less abruptly pointed than in *E. chierchiae*.

This species is very closely related to *E. chierchiae*. It is not named at this time, not only due to lack of more material including males, but also because a species of *Euconchoecia* lacking points at the postero-dorsal corners is presently being described (Tseng, personal communication).

SUBFAMILY HALOCYPRINAE Poulsen 1969

Poulsen (1969) separated the genus *Halocypris* into three genera: *Halocypris*, *Halocypria*, and *Fellia*. Two species of two of these genera were found at the station off Barbados.

Genus *Halocypris* Dana 1852
Halocypris brevirostris (Dana)

Halocypris brevirostris, Skogsberg, 1920, p. 584, Figs. 112–115.

Halocypris brevirostris, Deevey, 1968, p. 19, Fig. 2a–f, 3c–e.

Halocypris brevirostris, Poulsen, 1969, p. 63.

For synonymy, see Skogsberg.

H. brevirostris was found from November to May, with highest percentages in April. This species has a wide range in size of mature individuals. According to Poulsen (1969) mature females vary in length from 1.1–2.1 mm, and males from 0.9–1.9 mm. This species occurs year-round in the Sargasso Sea (Deevey, 1968), where all the mature specimens were small, females being 1.1–1.3 mm, males 0.95–1.15 mm long. Mature females from the Barbados station were 1.6 mm, males 1.4 mm long.

Distribution: 60°N–40°S in the Atlantic, Pacific, and Indian Oceans. According to Poulsen, it occurs most frequently in the tropics.

Genus *Fellia* Poulsen 1969
Fellia bicornis (Müller)
 (Figure 2)

Halocypris bicornis Müller, 1906a, p. 49, Pl. VIII, Figs. 8–12, 17; 1912, p. 58.

Halocypris taurina Vavra, 1906, p. 66, Pl. 7, Figs. 128–130, 131, 132a.

Fellia bicornis, Poulsen, 1969, p. 89, Fig. 38.

Poulsen has recently placed in a new genus, *Fellia*, two species that were formerly in the genus *Halocypris*, *F. cornuta* (Müller) and *F. bicornis* (Müller), with spines and/or rounded processes on the shells. Both these species occur in all oceans, mainly in tropical regions between 25°N and 25°S.

Ten specimens of *F. bicornis* were found at the Barbados station in September, January and February. Three juveniles were 0.6–0.7 mm long, four were 1.0–1.05 mm long, two were 1.4 mm long, and a mature female was 1.9 mm long by 1.55 mm high. Lateral, ventral and posterior views of the female shell, the frontal organ, first antenna, and the endopodite of the female second antenna are illustrated in Figure 2.

Distribution: Müller's specimens were found between 10°N and 10°S in the Atlantic and Indian Oceans. Poulsen's *Dana* specimens were collected from 45°N–8°S in the Atlantic, in the Indian-Indonesian region from 23°N–15°S, and in the Pacific from 5°–45°S. Very few specimens

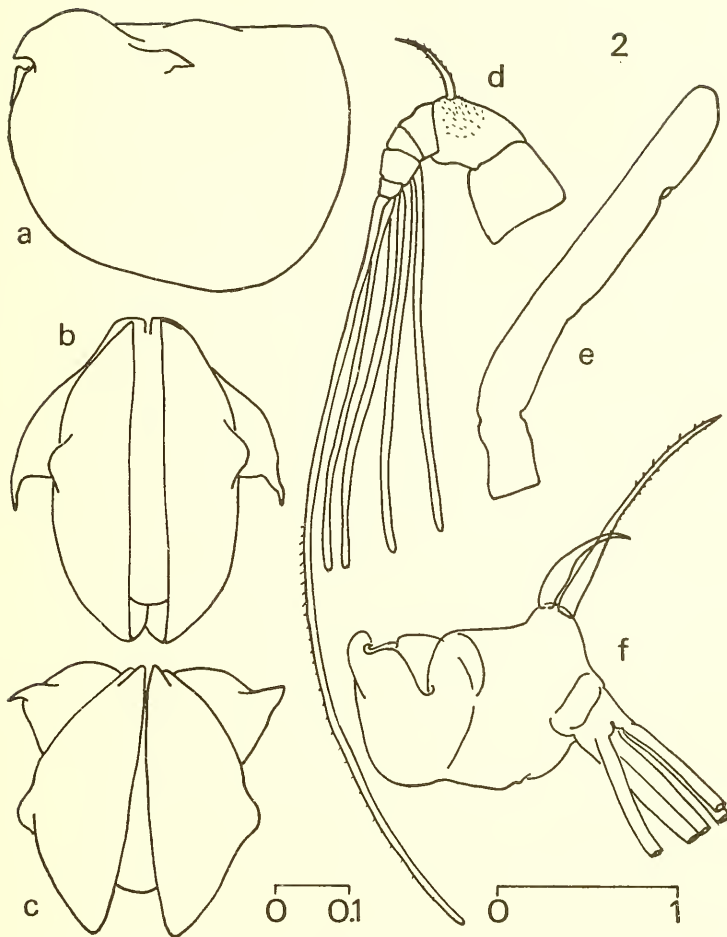


FIG. 2. Female *Fella bicornis* (Müller). a-c, Lateral, ventral and posterior views of shell. d, First antenna. e, Frontal organ. f, Endopodite of second antenna. Scale at bottom right for a-c, at bottom center for d-f. Scales in mm.

were caught in the upper waters; most were taken over a depth range of 600–6,000 m, the majority from depths of 1,000–3,000 m.

SUBFAMILY CONCHOECINAE Müller 1906

Genus *Conchoecia* Dana 1849

The subfamily Conchoecinae, which originally included all the genera of Halocyprids except *Thaumatoocypris*, is now, since Poulsen's (1969)

revision, restricted to the genus *Conchoecia*. This genus includes many species that have been classified into more or less natural groups of closely related forms.

Spinifera Group

Three species which Müller (1906a) included in this group were taken at the Barbados station.

Conchoecia spinifera (Claus)

Paraconchoecia spinifera Claus, 1890, p. 14; 1891, p. 65, Pl. X, Figs. 1-7.

Conchoecia spinifera, Müller, 1906a, p. 56, Pl. IX, Figs. 1-10, 14, 15; 1912, p. 69.

Conchoecia spinifera, Deevey, 1968, p. 30, Figs. 8-9.

Specimens of this species were found only in September and October 1963 and in January 1964. *C. spinifera* was less numerous at the Barbados station than in the Sargasso Sea, where it was found year-round in the upper 500 m (Deevey, 1968).

Distribution: 52°N-35°S in the Atlantic, Indian, and Pacific Oceans.

Conchoecia oblonga (Claus)

Paraconchoecia oblonga Claus, 1890, p. 13; 1891, p. 63, Pl. VIII, Figs. 10-11, Pl. IX, Figs. 1-14.

Conchoecia oblonga, Müller, 1906a, p. 58, Pl. IX, Figs. 11-13, 16-25; 1912, p. 69.

Conchoecia oblonga, Skogsberg, 1920, p. 617, Fig. 116.

Conchoecia oblonga, Deevey, 1968, p. 33, Figs. 10, 11.

This was the largest of the dominant species and was found in every sample, constituting 4.2-10.1 percent of the total numbers of ostracods.

Distribution: 38°N-37°S in the Atlantic and Indian Oceans and Mediterranean Sea.

Conchoecia echinata Müller

(Figures 3, 4)

Conchoecia echinata Müller, 1906a, p. 61, Pl. X, Figs. 14-24; 1906b, p. 3.

Conchoecia notocera Vavra, 1906, p. 58, Pl. 6, Figs. 114-120.

Conchoecia echinata Müller, 1908, p. 67; 1912, p. 70.

Conchoecia echinata, Iles, 1953, p. 268.

Seven females, three males and a number of juvenile specimens of *C. echinata* were noted in October 1963 and January, February, April and May 1964. The females were 1.9-2.0 mm long, the males 1.65-1.7 mm long.

Description: Shell (Fig. 3a, d-g) similar in appearance to that of *C. oblonga*, but slightly larger, narrower anteriorly, greatest depth in the posterior half, with a sharp point at the posterodorsal corner of the right shell in both sexes. Height of male shell about half the length, of female shell 42-43 percent of length. The asymmetric glands are in the

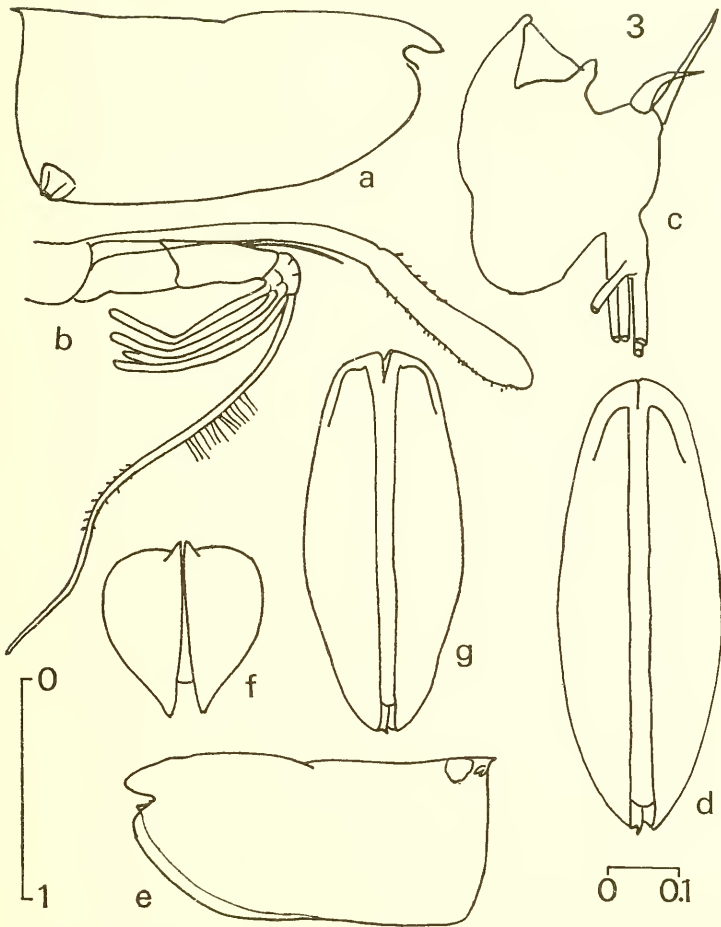


FIG. 3. *Conchoecia echinata* Müller. a, Lateral view of female shell. b, Female frontal organ and first antenna. c, Endopodite of female second antenna (setae and filaments cut off). d, Ventral view of female shell. e-g, Lateral, posterior, and ventral views of male shell. Scale at lower left for a, d-g; at lower right for b, c. Scales in mm.

usual location, the right one clearly defined at the posteroventral corner of the right shell. The female frontal organ (Fig. 3b) projects well beyond the tip of the first antenna, the capitulum covered with hairs on the proximal dorsal half and the ventral surface. The principal seta of the female first antenna has a row of long hairs anteriorly on the proximal

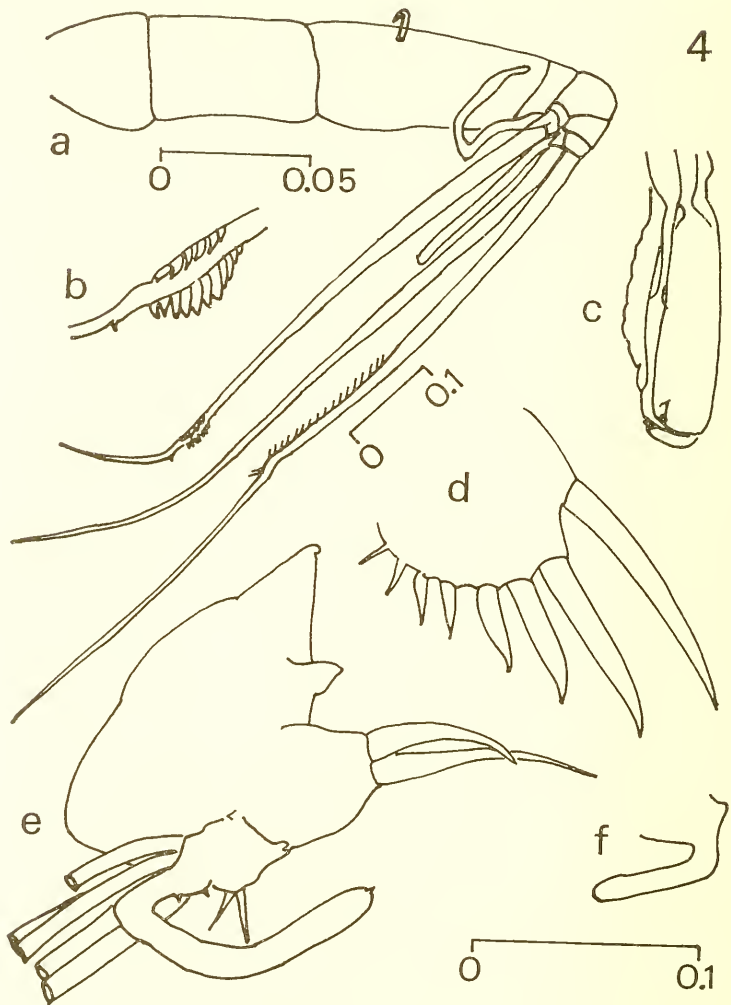


FIG. 4. Male *Conchoecia echinata* Müller. a, First antenna. b, Enlargement of portion of proximal secondary seta of first antenna. c, Penis. d, Furca. e, Endopodite of right second antenna (setae and filaments cut off). f, Left clasper organ. Scale at lower right for e, f; at center for a, c, d; at upper left for b. Scales in mm.

portion, as in other females of this group, and some spinules distally. The male principal seta (Fig. 4a) has 17-18 pairs (15, according to Müller) of thin teeth directed proximally and two directed distally at

the distal end of the row of teeth. The distal secondary seta is bare, but the proximal seta has, three-quarters of the way down its length, a fan-shaped group of 6–10 spines (Fig. 4b), and more distally a tiny spine. The male right clasping organ is large and strongly curved, the left quite small (Fig. 4e, f). The claws on the furca (Fig. 4d) are almost straight, and this immediately distinguishes this species from *C. oblonga*.

Distribution: 31°N–29°S in the Atlantic, Indian, and Pacific Oceans.

Elegans Group

Conchoecia elegans Sars

Conchoecia elegans Sars, 1865, p. 117.

Conchoecia elegans, Skogsberg, 1920, p. 624, Figs. 117, 118.

Conchoecia elegans, Deevey, 1968, p. 40, Fig. 14.

For synonymy, see Skogsberg.

This species was present in all the 400-m samples, and was therefore somewhat more numerous at this station than in the Sargasso Sea (Deevey, 1968). As in the Sargasso Sea, all the mature specimens noted were small, females and males being 1.2–1.3 mm long. Skogsberg has discussed the extraordinary size range of this species, which is recorded to have a range of 1.0–2.25 mm in length of mature specimens.

Distribution: 79°58'N–55°S in the Atlantic and Indian Oceans. The smaller forms of this species have been recorded between 37°N and 24°S in the Atlantic.

Procera Group

Conchoecia procera Müller

Conchoecia procera Müller, 1894, p. 228, Pl. 6, Figs. 47, 48, 50–58; 1906a, p. 71, Pl. XIII, Figs. 37–47, Pl. XIV, Figs. 3–6; 1912, p. 72.

Conchoecia procera, Deevey, 1968, p. 45, Figs. 16, 17.

This was one of the dominant species at the Barbados station, and constituted 7.3–22 percent of the total numbers of ostracods (see Table 1). The females noted were 1.1–1.15 mm long, males 0.95–1.0 mm long.

Distribution: 32°N–37°S in the Atlantic and Indian Oceans and Mediterranean Sea.

Acuminata Group

Conchoecia acuminata (Claus)

Conchoecetta acuminata Claus, 1890, p. 16; 1891, p. 67, Pls. XIII, XIV.

Conchoecia acuminata, Müller, 1906a, p. 76, Pl. XV, Figs. 17–23; 1912, p. 74.

Conchoecia acuminata, Skogsberg, 1931, p. 9.

Conchoecia acuminata, Deevey, 1968, p. 48, Fig. 19.

For further synonymy, see Skogsberg.

This species was present in all 400-m samples. Males were 2.2–2.3 mm, females 2.9–3.15 mm long.

Distribution: 43°N–37°S in the Atlantic, Indian, and Pacific Oceans.

Rotundata Group
Conchoecia rotundata Müller

Conchoecia rotundata Müller, 1890, p. 275, Pl. XXVIII, Figs. 41-43, Pl. XXIX, Fig. 44.

Conchoecia rotundata, Deevey, 1968, p. 51, Fig. 20e-j; Fig. 21b, c, e, i-k; Fig. 22b-e.

C. rotundata was relatively numerous and was taken in every sample, constituting 1.7-4.2 percent of the total numbers of ostracods. Males were 0.85-1.1 mm, females 0.85-1.15 mm long.

Distribution: Tropical Pacific Ocean and 15-32°N in the Atlantic Ocean.

Conchoecia nasotuberculata Müller
(Figures 5, 6)

Conchoecia nasotuberculata Müller, 1906a, p. 83, Pl. XVIII, Figs. 25-30; 1908, p. 69; 1912, p. 76.

Conchoecia nasotuberculata, Iles, 1953, p. 269.

Only two specimens of this species, a female 0.8 mm long by 0.45 mm high and a male 0.8 mm long by 0.42 mm high, were taken in the January 1964 sample.

Description: In lateral view the female (Fig. 5a) and the male (Fig. 6a) shells are fairly similar in appearance, narrowed anteriorly, the anteroventral and posteroventral corners rounded, the height of the shell slightly greater than half the length. The left asymmetrical gland protrudes on the left rostrum (Fig. 5f), the right gland is a short distance below the posterodorsal corner. In ventral and posterior views the shells of the two sexes are differently shaped. In the male the shoulder vaults are broadly rounded, the width of the shell is greatest at about mid-length, and the shell tapers to the posterior end (Fig. 6b, c). The female shell (Fig. 5b, c) has symmetrically rounded bumps at approximately three-quarters of the shell length, which protrude in ventral and posterior views, and the rostrum is much narrower than the male's.

The capitulum of the frontal organ projects beyond the tip of the first antenna; the female's (Fig. 5d) is rounded, with hairs or spinules on the ventral surface, the male's (Fig. 6d) has relatively long spines ventrally over the proximal two-thirds of its length and is bent upwards at the tip. The female principal seta has only a few spinules on the posterior side of the distal half; the male principal seta has 11-12 pairs of thin sharp teeth directed proximally. The shapes of the male clasping organs are shown in Figure 6e-f.

Iles (1953) reported this species abundant at several stations in the Benguela Current between 22-29°S, and most numerous at depths of 250-500 m.

Distribution: 18°N-40°S in the Atlantic, Indian Ocean and Mediterranean Sea.

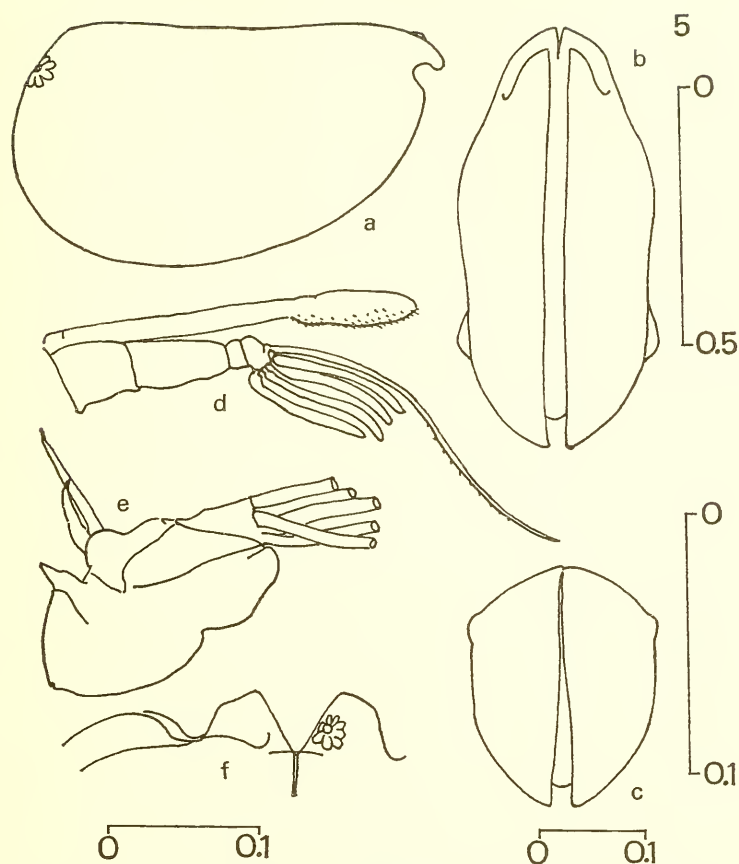


FIG. 5. Female *Conchoecia nasotuberculata* Müller. a-c, Lateral, ventral and posterior views of shell. d, Frontal organ and first antenna. e, Endopodite of second antenna (setae and filaments cut off). f, Inner view of rostrum. Scale at upper right for a-c; at lower right for e; at bottom right for f; at bottom left for d. Scales in mm.

Curta Group

Conchoecia curta Lubbock

Conchoecia curta, Müller 1906a, p. 86, Pl. XXX, Figs. 1-9; 1912, p. 77.

Conchoecia curta, Skogsberg, 1920, p. 661, Fig. 125.

Conchoecia curta, Deevey, 1968, p. 60, Fig. 26.

For synonymy, see Müller (1906a) and Skogsberg.

This was one of the most abundant species. Except in November, when it constituted only 1.9 percent of the total numbers of ostracods,

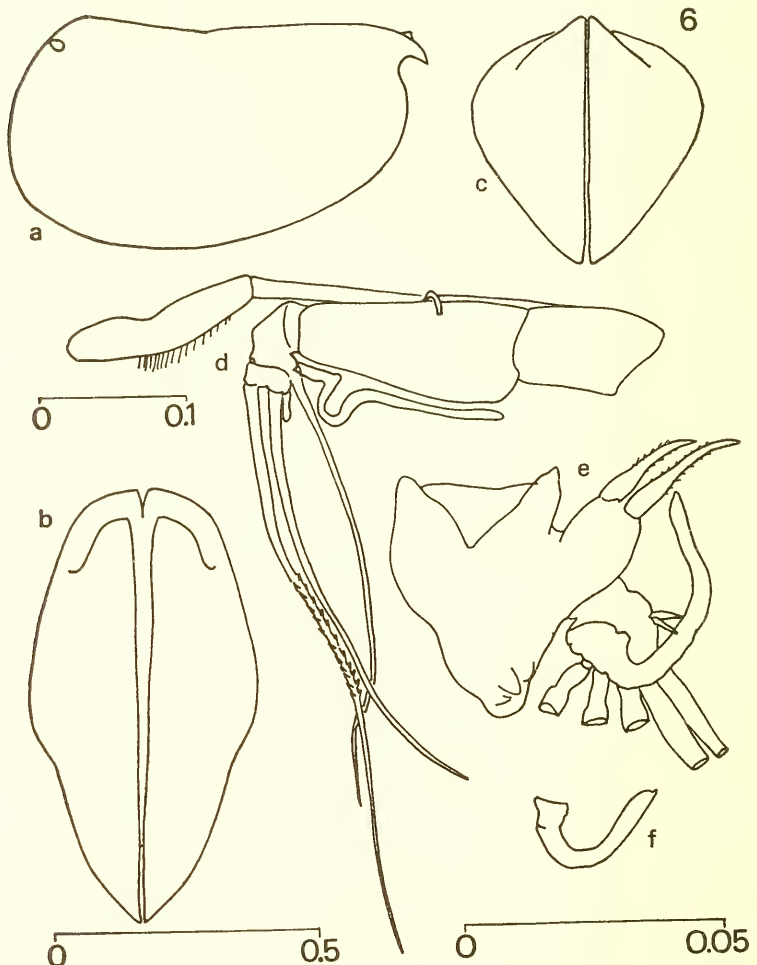


FIG. 6. Male *Conchoecia nasotuberculata* Müller. a-c, Lateral, ventral, and posterior views of shell. d, Frontal organ and first antenna. e, Endopodite of right second antenna (setae and filaments cut off). f, Left clasper organ. Scale at bottom left for a-c; at left center for d; at bottom right for e, f. Scales in mm.

percentages ranged from 12.2-18 percent (see Table 1). Females varied in length from 0.75-0.85 mm, males 0.75-0.8 mm. Some of the specimens had much more strongly arched shoulder vaults, but no other differences were noted.

Distribution: 42°N–37°S in the Atlantic, Indian, and Pacific Oceans and Mediterranean Sea.

Bispinosa Group

Conchoecia bispinosa Claus

Conchoecia bispinosa Claus, 1890, p. 10; 1891, p. 59, Pl. V, Figs. 1–10, Pl. VI, Fig. 1, Pl. VIII, Figs. 7, 8.

Conchoecia bispinosa, Skogsberg, 1920, p. 672, Fig. 128.

Conchoecia bispinosa, Deevey, 1968, p. 62, Figs. 27, 28.

This species was recorded from all but the April 1964 sample, and therefore was somewhat more abundant in these waters than in the Sargasso Sea, where specimens were taken only occasionally (Deevey, 1968). Females were 1.75–1.95 mm long, males 1.65–1.75 mm long.

Distribution: 42°N–29°S in the Atlantic Ocean.

Conchoecia scernenda Vavra

Conchoecia scernenda Vavra, 1906, p. 59, Pl. VI, Figs. 121–127.

Conchoecia scernenda, Deevey, 1968, p. 65, Figs. 29–31.

C. scernenda was present in every sample but one, and was almost as numerous at this station as in the Sargasso Sea, where it occurred year-round in the upper 500 m (Deevey, 1968).

Distribution: 37°N–7°S in the Atlantic Ocean.

Conchoecia atlantica (Lubbock)

Conchoecia atlantica, Müller, 1906a, p. 92, Pl. V, Figs. 6, 7, Pl. XIX, Figs. 17–28; 1912, p. 79.

Conchoecia atlantica, Rudyakov, 1962, p. 13, Fig. 9.

Conchoecia atlantica, Deevey, 1968, p. 69, Fig. 32.

For synonymy, see Müller (1906a).

C. atlantica occurred in every sample, and made up 6 percent of the total numbers of ostracods in April 1964. This is the largest species found at this station. Males were 3.4–3.45 mm long, females 3.6–3.65 mm long.

Distribution: 40°N–37°S in the Atlantic, Indian, and Pacific Oceans.

Magna Group

Conchoecia magna Claus

Conchoecia magna Claus, 1874a, p. 6, Pl. I, Fig. 6c, Pl. II, Figs. 16, 18; 1890, p. 8; 1891, p. 57, Pl. II, Figs. 1–9, Pl. III, Figs. 1, 2.

Conchoecia tetragona Sars, 1887, p. 254, Pl. XI, Figs. 5, 6, Pl. XIII, Figs. 5–9.

Conchoecia magna, Müller, 1894, p. 228, Pl. V, Figs. 7–12, 16–22, 27–31, 35–39, 45–52.

Conchoecia magna, Deevey, 1968, p. 77, Figs. 36, 37.

This species was present in all the samples except one.

Distribution: 52°N–55°S in the Atlantic, Indian, and Pacific Oceans and Mediterranean Sea.

Conchoecia subarcuata Claus

Conchoecia subarcuata Claus, 1890, p. 9; 1891, p. 58, Pl. III, Figs. 3–9, Pl. IV.

Conchoecia subarcuata, Müller, 1906a, p. 102, Pl. XXI, Figs. 10–16, 19; 1912, p. 83.

Conchoecia subarcuata, Skogsberg, 1920, p. 695.

Conchoecia subarcuata, Deevey, 1968, p. 86, Figs. 42, 43

For synonymy, see Skogsberg.

A few specimens of this species were taken in September, November, January and May. Females were 2.0–2.1 mm, males 1.8–1.85 mm long.

Distribution: 37°N–56°S in the Atlantic, Indian, and Pacific Oceans.

Conchoecia spirostris Claus

Conchoecia spirostris Claus, 1874, p. 6, Pl. I, Figs. 1, 6a, Pl. II, Figs. 11, 14, 15; 1890, p. 7; 1891, p. 56, Pl. I, Figs. 1–12.

Conchoecia spirostris, Müller, 1894, p. 227, Pl. VI, Figs. 1–9, 13.

Conchoecia spirostris, Skogsberg, 1920, p. 697, Fig. 134.

Conchoecia spirostris, Deevey, p. 80, Figs. 38, 39.

For further synonymy, see Skogsberg.

This species was present in all the 400-m samples, constituting 2.1–5.1 percent of the total numbers of ostracods. It was also noted in the surface samples. It was less numerous at the Barbados station than in the Sargasso Sea, where it was probably the most abundant form in the upper 500 m (Deevey, 1968).

Distribution: 45°N–24°S in the Atlantic, the Mediterranean and 33°N in the Pacific.

Conchoecia porrecta Claus

Conchoecia porrecta Claus, 1890, p. 12; 1891, p. 61, Pl. VII, Figs. 1–13.

Conchoecia porrecta, Deevey, 1968, p. 83, Figs. 40, 41.

C. porrecta was present in every sample, in higher percentages in October and November, and therefore is a commoner species in the waters off Barbados than in the Sargasso Sea, where it occurred infrequently (Deevey, 1968). Males were 1.3–1.35 mm long, intermediate in size between *C. spirostris* and *C. parthenoda* males, which they resemble in the shape of the shell. Females were 1.52–1.65 mm long and are similar in size and appearance to female *C. parthenoda*, but differ from the latter species in that the left asymmetrical gland does not protrude above the dorsal margin of the shell.

Distribution: 41°N–2°N in the Atlantic Ocean.

Conchoecia parthenoda Müller
(Figure 7)

Conchoecia parthenoda Müller, 1906a, p. 78, Pl. XVI, Figs. 24–29.

Conchoecia parthenoda, Deevey, 1968, p. 71, Figs. 33–35.

This species was originally placed in the *Obtusata* Group, before the male was described (Deevey, 1968). The male is similar in shape to all males of the *Magna* Group, and both males and females appear most closely related to *C. spinirostris* and *C. porrecta*. *Conchoecia parthenoda* was a common species at the Barbados station and was found in every sample, in higher percentages from November to May. Also during the period from November to May some specimens were present which differed in that the left asymmetrical gland was located farther forward on the dorsal margin. Most of these specimens were juveniles, but males 1.6 mm long were found in the January and May samples. One of these is illustrated in Figure 7. Aside from being slightly larger (males of *C. parthenoda* are 1.35–1.5 mm long), the armature of the principal seta (Fig. 7g) of these males had several more teeth: 8 pairs of closely set teeth distally, 6 pairs of alternating teeth, then 12 more widely spaced teeth proximally, making in profile 31–32 teeth. Also, the left asymmetrical gland was located farther forward on the dorsal margin, so that it was 23–24 percent of the total length from the posterodorsal corner; in the smaller *parthenoda* males the left asymmetrical gland is 14–16 percent of the total length from the posterodorsal corner.

Distribution: 37°N–30°S in the Atlantic and Indian Oceans.

Conchoecia parvidentata Müller
(Figure 8)

Conchoecia parvidentata Müller, 1906a, p. 100, Pl. XX, Figs. 11–13; 1908, p. 73; 1912, p. 83.

Conchoecia parvidentata, Skogsberg, 1920, p. 692, Fig. 132.

A single female of this species, 2.55 mm long by 1.23 mm high, was taken in September 1963.

Description: Shell narrower anteriorly, length slightly more than twice the height, greatest height in the posterior half, anteroventral and posteroventral corners rounded (Fig. 8a, b). The asymmetrical glands are in the usual location, but lateral corner glands are also present, the one on the right shell just dorsal to the right asymmetrical gland. This species lacks the gland cells beneath the rostral incisure, which are found in some members of the *Magna* Group, and this distinguishes this species from *C. lophura*, which is the same size but also has a group of gland cells on the ventral margin at the posteroventral corner of the left shell. The frontal organ extends well beyond the first antenna (Fig. 8c); the capitulum is large and bent downwards from the stem, covered with spines on the ventral surface and on the dorsal proximal third. The principal seta of the first antenna has many spinules distally on the

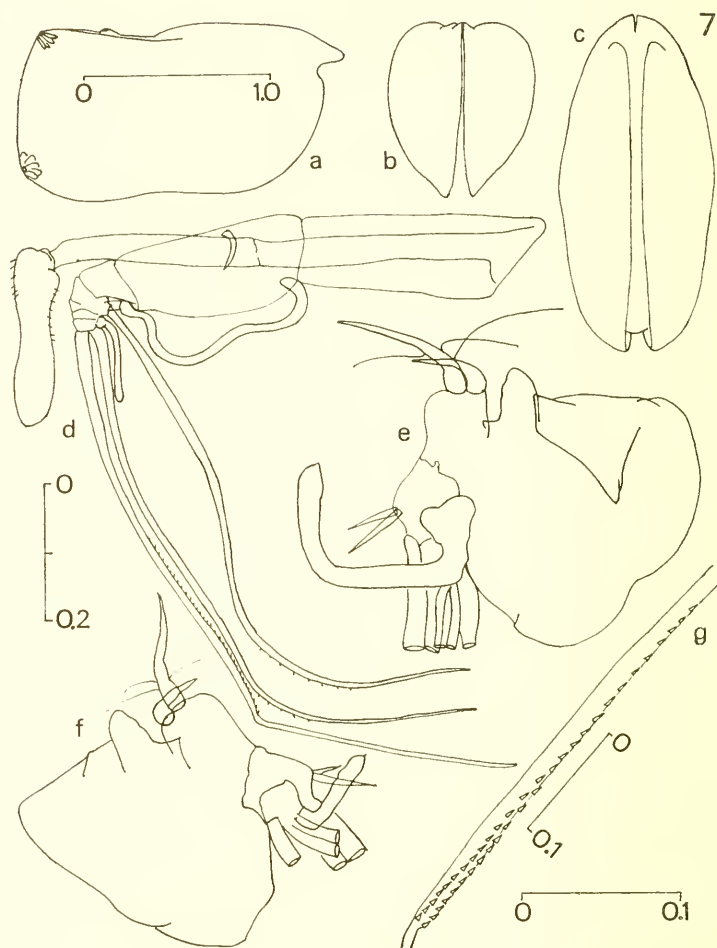


FIG. 7. Male *Conchoecia parthenoda* Müller, with left asymmetrical gland moved farther forward on the dorsal margin. a-c, Lateral, posterior and ventral views of shell. d, Frontal organ and first antenna. e and f, Endopodites of right and left second antennae (setae and filaments cut off). g, Armature of principal seta of first antenna. Scale on a for a-c; beside g for g; at left for d; at bottom right for e, f. Scales in mm.

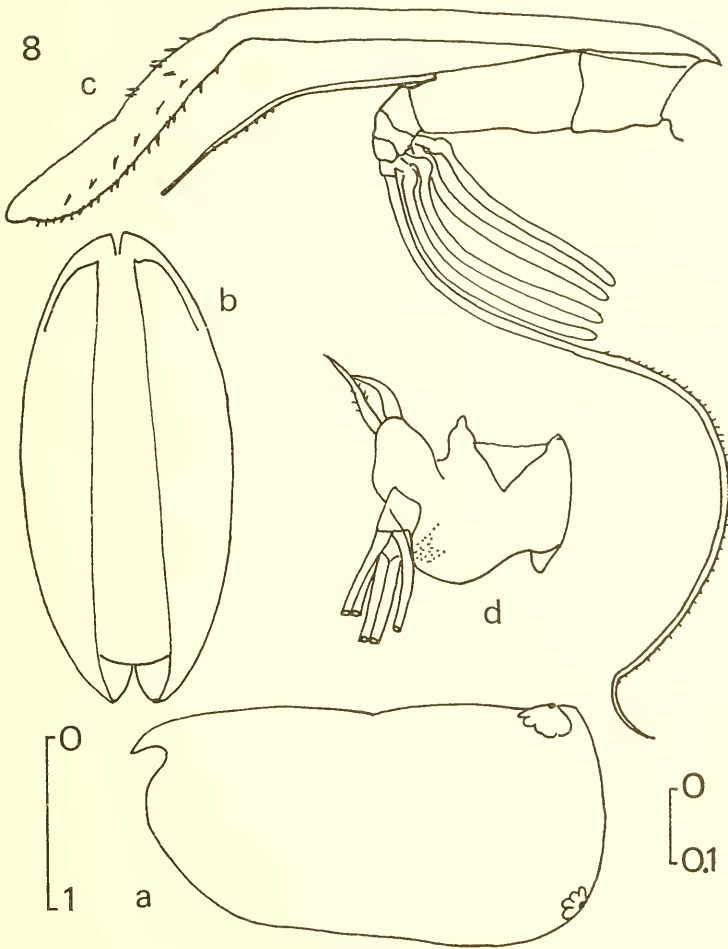


FIG. 8. Female *Conchoecia parvidentata* Müller. a, b, Lateral and ventral views of female shell. c, Frontal organ and first antenna. d, Endopodite of second antenna (setae and filaments cut off). Scale at lower left for a, b; at lower right for c, d. Scales in mm.

posterior surface. According to Skogsberg, the appendages are similar to those of *C. lophura*.

Apparently this species has been recorded only by Müller and Skogsberg, and Skogsberg's specimens were all females. Müller's (1906a) description of the male was brief; he described the armature of the principal seta as a long double row of small, fine, proximally directed

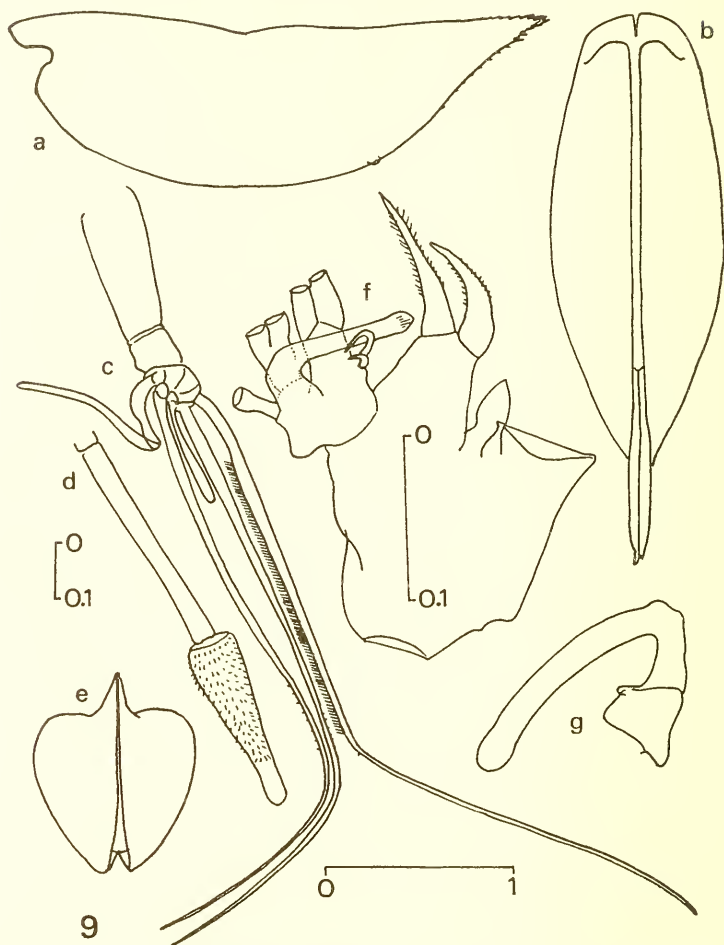


FIG. 9. Male *Conchoecia daphnoides* (Claus). a, b, e, Lateral, ventral, and posterior views of shell. c, First antenna. d, Ventral view of frontal organ. f, Endopodite of left second antenna (setae and filaments cut off). g, Right clasper organ. Scale at bottom center for a, b, e; at left for c, d; on f for f, g. Scales in mm.

teeth, thicker distally than proximally, and hard to distinguish. He noted that the longer bristle of the basal segment of the endopodite of the second antenna had strong spinules but lacked the long hairs characteristic of most males of the *Magna* Group. Müller gave the length of females as 2.5–2.7 mm, of males as 1.9–2.4 mm.

Distribution: 31°N–48°S in the Atlantic and Indian Oceans.

Daphnoides Group
Conchoecia daphnoides (Claus)
(Figure 9)

Conchoecilla daphnoides Claus, 1890, p. 17; 1891, p. 68, Pl. XV, Figs. 1-12.

Conchoecia daphnoides, Vavra, 1906, p. 45, Pl. III, Figs. 49-55.

Conchoecia daphnoides var. *typica* and var. *minor*, Müller, 1906a, p. 126, Pl. XXXI, Figs. 1-15.

Conchoecia daphnoides, Skogsberg, 1931, p. 20, Fig. V.

Conchoecia daphnoides, Deevey, 1968, p. 111, Fig. 60.

For further synonymy, see Skogsberg.

Specimens of *C. daphnoides* were taken in every sample but one.

This species has a wide range in length of mature specimens, females being 4.2-5.9 mm and males 2.25-3.25 mm long. Although juvenile stages were present for most of the year in the upper 500 m of the Sargasso Sea (Deevey, 1968) no mature males were caught. One male, 2.8 mm long by 0.9 mm high, was taken in the January 1964 sample at the Barbados station.

Description of male: Shell elongate, but less so than female's, height approximately one-third length, ventral margin strongly rounded, shoulder vaults rounded (Fig. 9a, e), the right asymmetrical gland near the anteroventral corner beneath the rostrum, the left just below the posterodorsal corner of the left shell. Sculpture fairly striking, as illustrated by Müller (1906a, Pl. XXXI, Fig. 1). Three small lateral gland groups are present, two below the left asymmetrical gland, one near the posteroventral corner of the left shell. In ventral view (Fig. 9b) the rostrum is rounded, unlike the female's which is pointed with the point of the left rostrum extending well beyond the right. In a ventral view of the female shell the right posterodorsal corner projects well beyond the left; in the male the posterodorsal corners are of almost equal length, the right point slightly longer.

The male frontal organ bends up near the tip, most of the ventral surface covered with spines (Fig. 9d). The basal segments of the first antenna are relatively long and slim, and the principal seta is armed with a long row of approximately 140 pairs of thin fine teeth directed proximally, but no fine spines directed distally were present. The secondary setae have only a few spinules near the bend (Fig. 9c). On the basal segment of the endopodite of the second antenna the rounded portion that bears the two strong bristles is exceptionally large, the bristles are sharply bent and covered with spinules. The clasping organs are shown in Figure 9f, g.

Distribution: Atlantic (60°N-37°S), Pacific, and Indian Oceans.

The last two species found at the Barbados station have not been assigned to any group.

Conchoecia concentrica Müller
(Figures 10, 11a, b)*Conchoecia concentrica* Müller, 1906b, p. 10, Pl. I, Figs. 1-9; 1912, p. 82.? *Conchoecia pectinata* Leveau, 1966, p. 249, Pls. 1, 2.*Conchoecia concentrica*, Deevey, 1968, p. 95, Figs. 48-50.

Juvenile specimens of *C. concentrica* were present in September and November 1963 and May 1964; one female 1.65 mm long was taken in April and one male 1.42 mm long in May 1964.

Müller described this species from three females and one male, and unfortunately did not figure the female shell. *Conchoecia concentrica* varies considerably in the sculpturing of the shell, presumably depending on the length of time since molting. The specimens found in the Sargasso Sea (Deevey, 1968) and at the Barbados station appear to differ from Müller's description only in that there is a tiny blunt point at the posterodorsal corner of the left shell instead of on the right. The shoulder vaults are swollen and extended laterally, as is evident in anterior or posterior view, and are blunt-edged in the male (Fig. 11b), but sharper-edged in immature specimens and some females (Fig. 10b, d, f), depending on the extent of the sculpturing. Müller remarked only "Schulterwulst stark vortretend, stumpfkantig." As noted previously (Deevey, 1968), the shoulder vaults of immature specimens and females "are relatively sharp-edged and may have projecting blunt spines (Fig. 10c-g), evidently prolongations of the sculpturing, which are proportionately larger in smaller individuals or may be lacking or broken off." The spines are usually broken off on mature females, so that in anterior or posterior view the shoulder vaults are blunt-edged (Fig. 10b). It is possible that the specimens described by Leveau (1966) as *Conchoecia pectinata* were immature *C. concentrica*. Stage IV individuals are 0.8-0.85 mm long, stage V specimens 1.1-1.3 mm long, the length range of Leveau's specimens. The blunt spines on the shoulder vaults of such immature specimens of *C. concentrica* (Fig. 10g) are as figured by Leveau (Pl. 1, Fig. 7) for *C. pectinata*. Leveau's figures indicate that he was describing immature specimens. His drawing of the furca of *C. pectinata*, for example, shows only 7 claws and an unpaired bristle on the furca. The number and lengths of the claws are similar in 1.1-1.3 mm long juveniles of *C. concentrica*.

In some respects *C. concentrica* resembles members of the *Bispinosa* Group. The capitulum of the male frontal organ is bent upwards and spined as in *C. bispinosa*; also the proximal secondary seta of the male first antenna has a pad or callous, such as is found in the *C. bispinosa* male. However, one of the two setae of the second segment of the endopodite of the male second antenna is not strikingly long, and the female lacks the extra bristle on this segment. *Conchoecia concentrica* differs also in having lateral corner glands near the posteroventral corners

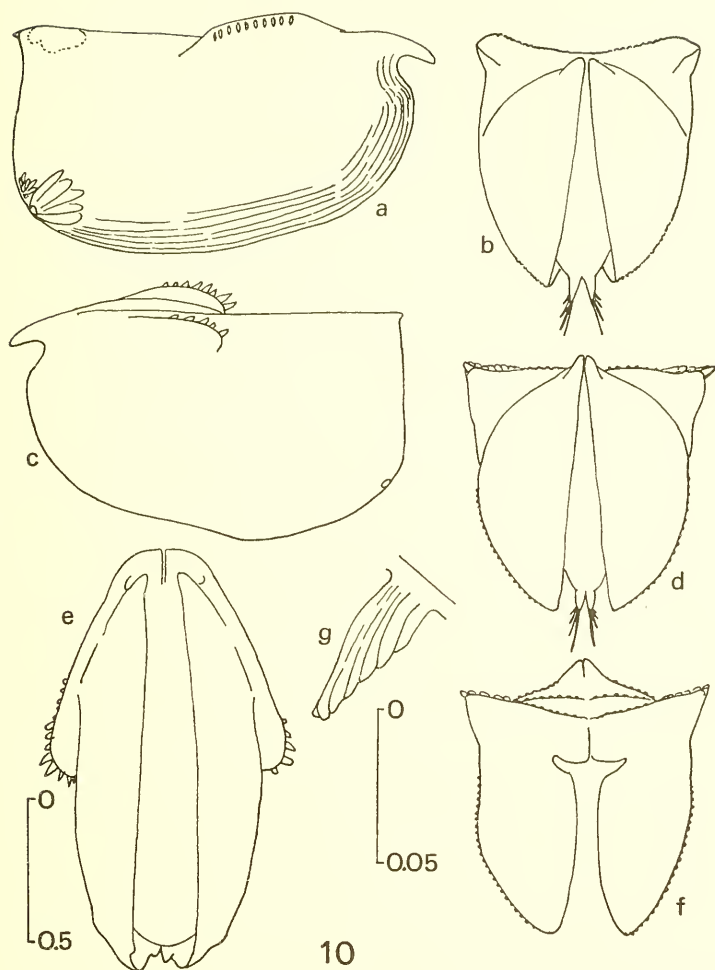


FIG. 10. Female *Conchoecia concentrica* Müller. a, b, Lateral and posterior views of a specimen from the Barbados station. c-f, Lateral, posterior, ventral and anterior views of specimen from the Sargasso Sea still retaining spines on shoulder vaults. g, Enlargement of spine. Scale at lower left for a-f; at lower center for g. Scales in mm.

of both shells. Skogsberg (1920) believed that *C. concentrica* might be related to *C. serrulata*.

Distribution: As previously known, the distribution was the Malay Archipelago and 38°N-32°N in the Atlantic Ocean; the Barbados specimens extend the range to 15°N.

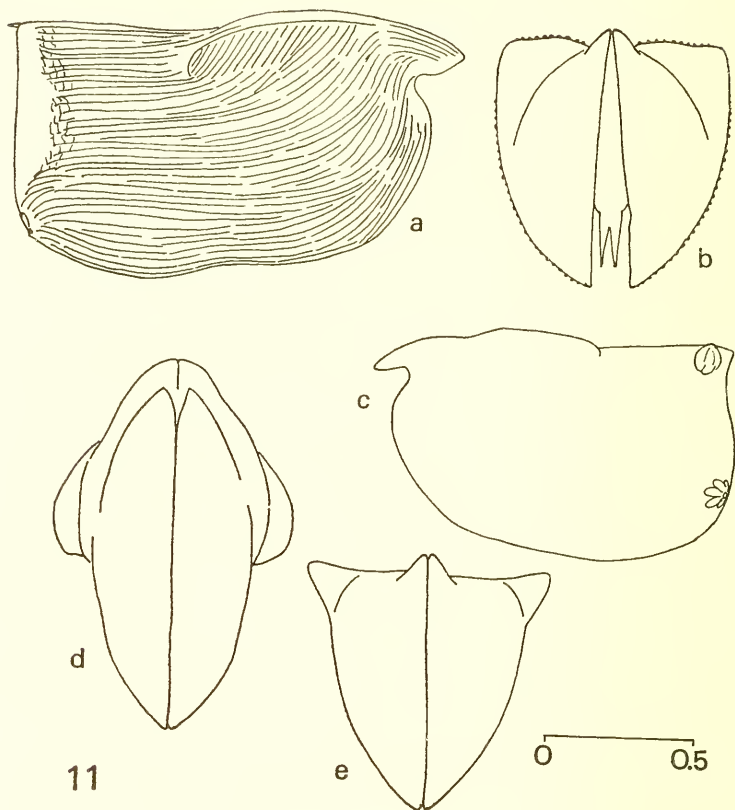


FIG. 11. a, b, Lateral and posterior views of male *Conchoecia concentrica* Müller. c-e, Lateral, ventral, and posterior views of juvenile *Conchoecia* sp. Scale for a-e, in mm.

Conchoecia sp.
(Figure 11c-e)

Conchoecia sp., Deevey, 1968, p. 114, Fig. 61.

Five juvenile specimens of a species not yet named due to lack of mature specimens were found in September 1963 and May 1964. These juveniles were 0.6, 1.15, 1.2, 1.6, and 1.65 mm long. This species resembles *C. concentrica* in the shape of the shell, but is larger at maturity and of slim build, whereas *C. concentrica* is a plump species, the body always filling the shell. The shell appears to lack sculpturing, but faint lines may be seen, running anteroposteriorly in a pattern similar to the

sculpturing of the *C. concentrica* shell. The asymmetrical glands and lateral corner glands are situated as in *C. concentrica*. The postero-dorsal corners of both shells are rather bluntly rounded and of equal size, neither the right nor the left shell produced into a definite point. Lateral, posterior, and ventral views of the 1.2 mm juvenile shell are shown in Figure 11c-e.

Distribution: 32°N-15°N in the Atlantic Ocean.

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